

REMARKS**1. The Amendments and the Support Therefor**

One claim (35) has been canceled, twelve new claims (36-47) have been added, and claims 22 and 34 have been amended to leave claims 1, 2, 19-30, 34, and 36-47 in the application. A check for any newly-submitted claims in excess of the amount previously paid for should accompany this Response, as per 37 CFR §1.16(b)-(d), with the fee due being calculated as follows:

FEE CALCULATION

For	Already Paid	No. Extra	Rate (SMALL ENTITY)	Fee (SMALL ENTITY)
Total Claims	27 - 20 =	7	x \$9 =	\$63
Independent Claims	2 - 3 =	0	x \$42 =	\$0
Total:				\$63

No new matter has been added by the amendments or new claims, which find support as follows:

- Claim 22 is amended to recite the antioxidant of claim 34.
- Claim 34 has been amended to incorporate claim 35 (which was indicated as allowable), and thus claim 34 is submitted to be allowable for at least the same reasons as claim 35.
- The following new dependent claims all ultimately depend from amended claim 34, and are thus submitted to be allowable for at least the same reasons as amended claim 34:
 - New claim 36, dependent from claim 34, finds support in claims 1 and 2.
 - New claim 37, dependent from claim 34, finds support in claims 1 and 2.
 - New claim 38, dependent from claim 34, finds support in claim 1.
 - New claim 39, dependent from claim 38, finds support in claim 19.
 - New claim 40, dependent from claim 38, finds support in claim 2.
 - New claim 41, dependent from claim 40, finds support in claim 19.
 - New claim 42, dependent from claim 34, finds support in claim 20.
 - New claim 43, dependent from claim 34, finds support in claims 25 and 26.
 - New claim 44, dependent from claim 43, finds support in claim 20.
 - New claim 45, dependent from claim 44, finds support in claim 19.
 - New claim 46, dependent from claim 44, finds support in claim 2.

- New claim 47, dependent from claim 46, finds support in claim 19.

2. Rejection of Claim 34 under 35 USC §102 in view of JP 63-74681

The rejection of claim 34 is obviated by its amendment to incorporate claim 35, which was indicated as allowable (page 10 of the Office Action).

3. Rejection of Claims 1 and 20-29 under 35 USC §103(a) in view of U.S. Patent 4,759,970 to Seeger, Jr. et al. and WO/97/48257

Kindly reconsider the rejection of claim 1 for the reasons noted below. Before specifically discussing the unobviousness of claim 1, it is first useful to review the references cited in the rejection.

Seeger, Jr. et al. teaches formation of a chip carrier on a *rigid substrate* (column 5, lines 3-4) by the sequential application of (1) a thermosetting adhesive layer 12; (2) a particle-loaded ink layer 13; and (3) an electrically conductive plating 14 (column 3 lines 42-46, Figs. 2 and 4). Regarding these layers:

- (1) The thermosetting adhesive layer 12 is pad-printed on the substrate in a 0.0001-0.0004 in. (2.5-10 micron) layer (column 5 lines 7-55). However, *Seeger* is to some degree inconsistent insofar as the adhesive layer 12 is also stated to be applied in a 0.001-0.005 in. (15-102 micron) layer (column 9 lines 40-41).
- (2) The ink layer 12, the contents of which are discussed at column 5 line 56 onward, are applied by pad printing (column 10 lines 1-37) in 0.0005-0.0015 in. (12.7-38 micron) layers (column 9 lines 36-38). It is noted that multiple "hits" or "reprints" of the inked pad may be needed in order to obtain ink deposits of sufficient thickness (column 10 lines 34-37).
- (3) The plated conducting layer 14 is then applied by electroless plating (column 8 lines 51-54, column 10 line 50 onward) in a 0.0008-0.003 in. (20-76 micron) layer (column 8 lines 54-55). *Seeger* is again somewhat inconsistent insofar as the plated conducting layer 14 is also stated to be applied in a 0.002-0.005 in. (50-127 micron) layer (column 9 lines 36-

39).

WO 97/48257 then teaches the lithographic printing of a conductive ink on a substrate to form a conductive circuit trace (page 1 line 36-page 3 line 25). The ink trace is not a seeding layer, since no further layers are deposited atop it; rather, the conductive ink itself forms the conductive trace. The ink is printed in layers of approximately 5 microns thick (page 4 lines 8-15).

It is submitted that when these references are considered objectively for all that they teach, they would not truly lead one of ordinary skill, who had no knowledge of the present invention, to combine their teachings to obtain the invention of claim 1 (as amended). Kindly give careful consideration to the following.

WO 97/48257 describes how its 5 micrometer ink layers are advantageous for their thinness (page 4 lines 8-15), and for their low ink volume per unit, low cost, and environmental benefits (page 2 lines 5-11), while at the same time being sufficiently conductive that the ink traces themselves accomplish the function of a circuit (column 7 lines 3-6), including formation of passive circuit components such as resistors and capacitors (page 8 line 23 onward). As discussed in prior Responses, it is submitted that an ordinary artisan would see no benefit or advantage to modifying WO 97/48257 to add further conductive layers since the functionality/purpose of such layers is already provided by the existing ink trace of WO 97/48257. Thus, the addition of further conductive layers to WO 97/48257 would be redundant, and would defeat the size, cost, and other benefits that WO 97/48257 seeks to attain.

Seeger, Jr. et al. does not describe the use of lithographic printing to lay down its ink, and instead describes the use of transfer printing (column 9 line 36), more specifically direct pad printing (column 2 lines 41-56). As noted in prior Responses, lithographic printing applies a much thinner layer of ink than transfer printing; this is illustrated by the fact that *Seeger's* ink layers are 12.7-38 microns thick (column 9 lines 36-38), which are several times the thickness of lithographically applied layers (see, e.g., claim 25 of the present application). Further, *Seeger* suggests that ink layers of this thickness are necessary to obtain a "sufficient ink deposit" for the subsequent plating step (see *Seeger* at column 10 line 34 onward), and to meet *Seeger's*

"plateability standard test" (noted at column 7 line 43 onward).

Consider that pad printing is a one step process (simply stamp the substrate), whereas lithographic printing is a multistep process (wet the master, ink the master, transfer the master's image to the intermediary, then apply the intermediary to the substrate). Thus, pad printing is more easily (and probably economically) performed than lithographic printing. Further, from the cited references, lithography does not appear to apply ink layers which are sufficient to meet the desired thicknesses and plating standards sought by *Seeger*: *Seeger* in fact appears to specifically use pad printing because other processes do not yield the desired ink layer thickness. It is therefore submitted that an ordinary artisan who did not know of the claimed invention would not in fact be led by *Seeger* and WO 97/48257 (or any other reference) to construct the invention of claim 1, which explicitly recites lithographic deposition of the ink (seeding) layer, since lithography simply does not provide the thicknesses that *Seeger* describes as necessary.

Much the same reasoning holds for claim 25: *Seeger* would lead one of ordinary skill to believe that ink layers thicker than those recited would be needed in order to obtain a sufficient basis for plating.

Similarly, claims 26 and 27 recite plated layers which are far thinner than those noted in *Seeger*, and it does not appear that an ordinary artisan would believe that such thinner layers would be effective: *Seeger*'s thicker layers appear necessary to pass the strength standards of column 8 line 18 onward of *Seeger*. Regarding these claims, the Office Action states at pages 6-7 that:

this is well within the skill of the artisan dependent upon the intended use of the device, particularly to the environment to which the device will encounter, which would be most suited for the application of the device, absent evidence to the contrary.

Furthermore, the thickness of the first electrically conducting layer is a result-effective variable and one skilled in the art has the skill to calculate the thickness that would determine the success of the desired reaction to occur, e.g., thick enough to carry sufficient current, absent evidence to the contrary. MPEP § 2141.03 and §2144.05(b).

However, these are not proper bases for an obviousness rejection, and are not supported by the cited sections of the MPEP. As noted in MPEP 2143.01, the prior art *must* suggest the desirability of the claimed invention (and the level of skill in the art cannot be relied upon to

provide the suggestion to combine references), and to guard against hindsight, it is necessary to present *specific facts* showing that there is a *true and objective* motivation presented by the prior art to combine or modify the references. Here, the rejections rely on an improper *per se* rule of obviousness, i.e., they rely on an alleged "general principle" of obviousness rather than the specific facts of the current case. This approach is incorrect because it fails to make the fact-intensive inquiry mandated by §103, and it does not show why one of ordinary skill in the art in question would truly and objectively be led by the references to make the asserted modification or combination. The Court of Appeals for the Federal Circuit has explicitly forbidden the use of *per se* rules in *In re Ochiai*, 37 USPQ2d 1127 (Fed. Cir. 1995):

The use of *per se* rules, while undoubtedly less laborious than a searching comparison of the claimed invention -- including all its limitations -- with the teachings of the prior art, flouts section 103 and the fundamental case law applying it. *Per se* rules that eliminate the need for fact-specific analysis of claims and prior art may be administratively convenient for PTO examiners and the Board. Indeed, they have been sanctioned by the Board as well. But reliance on *per se* rules of obviousness is legally incorrect and must cease. Any such administrative convenience is simply inconsistent with section 103, which, according to *Graham* and its progeny, entitles an applicant to issuance of an otherwise proper patent unless the PTO establishes that the invention as claimed in the application is obvious over cited prior art, based on the specific comparison of that prior art with claim limitations. We once again hold today that our precedents do not establish any *per se* rules of obviousness, just as those precedents themselves expressly declined to create such rules. Any conflicts as may be perceived to exist derive from an impermissible effort to extract *per se* rules from decisions that disavow precisely such extraction.

Id. at 1133. See also *Litton Systems Inc. v. Honeywell Inc.*, 39 USPQ2d 1321, 1325 (Fed. Cir. 1996) ("As we expressly recognized in *Ochiai*, the obviousness inquiry is highly fact-specific and not susceptible to *per se* rules. The Supreme Court has underscored the fact intensive nature of the test for obviousness."). In short, if the *particularly claimed* invention is reviewed versus the *particular background* provided by the prior art in the field of the invention, it is submitted that there is in fact no true and objective reason suggested by the art to adopt the claimed features.

Regarding the remaining claims 2 and 19-30, all of which ultimately depend from claim 1, it is submitted that these claims are allowable for at least the same reasons as claim 1.

4. In Closing

If any questions regarding the application arise, please contact the undersigned attorney. Telephone calls related to this application are welcomed and encouraged. The Commissioner is authorized to charge any fees or credit any overpayments relating to this application to deposit account number 18-2055.

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ATTACHMENTS:

- PTO-2038 (\$273)